

REMARKS

Entry of the above-noted amendments, reconsideration of the application, and allowance of all claims pending are respectfully requested. By this amendment, claims 15, 22, and 27 are amended and claims 17 and 28 are canceled. These amendments to the claims constitute a bona fide attempt by Applicants to advance prosecution of the application and obtain allowance of certain claims, and are in no way meant to acquiesce to the substance of the rejections. It is believed that the amendments made herein place the entire application in condition for allowance and/or better form for appeal. These amendments were not made earlier because the claims as previously submitted were believed to be in condition for allowance. Applicants submit no new search is required since all the claim language added to claims 15, 22, and 27 was recited in previous dependent claims 17 and 28. Support for the amendments can be found throughout the specification, figures, and claims (e.g., previous claims 17 and 28) and thus, no new matter has been added. Claims 1-12 and 14-29 are pending.

Claim Rejections - 35 U.S.C. § 103:

In the Final Office Action mailed November 23, 2005 the Examiner rejected claims 15, 16, 19-21 and 27 under 35 U.S.C. §103(a) as being unpatentable over Toth (USP 5,457,724; "Toth '724") in view of Zhou et al. (US Pub. 2002/0094064) and Li (USP 6,459,755). The Examiner next rejected claims 17, 18, and 28 under 35 U.S.C. §103(a) as being unpatentable over Toth '724, Zhou et al., and Li as applied to claims 15 and 27 above, and further in view of Lienard et al. (US Pub. 2003/0007603). Claims 22 and 24-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Toth '724, in view of Zhou et al., and Kendrick et al. (US Pub. 2003/0206614). Claim 23 is rejected under 35 U.S.C. §103(a) as being unpatentable over Toth '724, Zhou et al., and Kendrick et al., as applied to claim 22 above, and further in view of Kobayahi (USP 5,577,095). Claim 29 is rejected under 35 U.S.C. §103(a) as being unpatentable over Toth '724, Zhou et al., and Li as applied to claim 27 above, and further in view of Kendrick et al. These rejections are respectfully, but most strenuously, traversed.

Applicant appreciates allowability of claims 1-12 and 14.

For explanatory purposes, Applicants discuss herein one or more differences between the Office Action's citations to the applied references and the claimed invention with reference to one or more parts of the applied references. This discussion, however, is in no way meant to

acquiesce in any characterization that one or more parts of the Office Action's citations to the applied references correspond to the claimed invention.

Applicants respectfully submit that the Office Action's citations to the applied references do not teach or suggest one or more elements of the claimed invention. A careful reading of the Office Action's citations to the applied references fails to teach or suggest, for example, the at least one processor that is caused to determine the centroid of the subject from the at least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15.

Toth '724 discloses (column 3, line 28, to column 4, line 62) computer 26:

Referring particularly to FIG. 2, the computer 26 directs the system components to carry out the prescribed scan in accordance with stored programs. The program illustrated by the flow chart in FIG. 3 is executed by computer 26 to implement the preferred embodiment of the present invention. The first step is to acquire scout data, as indicated at process block 110. As illustrated in FIG. 4, this scout data is comprised of two orthogonal views from each slice position in the prescribed scan, one at a gantry angle of 0.degree. and the other at an angle of 90.degree..

As indicated at process block 111, the usual corrections are made to the acquired scout data S.sub.0 and S.sub.90 to correct for offsets and to normalize to a reference detector. The projections are then filtered at process block 112. This filtering includes masking out attenuation due to undesired objects such as the patient table, followed by low pass filtering the scout projection data using an 11 point box car filter.

As indicated at process block 113, the edges of the patient are then located in each scout projection. The attenuation data for each detector element (i) in the projection is compared to a threshold (thresh=1.5) and the lowest detector [low.sub.0 and low.sub.90] and the highest detector [high.sub.0 and high.sub.90] located at the ends of the longest contiguous string of readings above the threshold are selected as shown in FIG. 4. As indicated by process block 114 and shown in FIG. 4, the center 115 of the patient 15 is then located in each projection: ##EQU1## The same edges are used to determine the edge which is furthest from the isocenter 19 in each projection.

cdet=isocenter detector element

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if cdet-low.sub.0 >hi.sub.0 - cdet then max.sub.13 rad.sub.0 =cdet-
low.sub.90

else max.sub.13 rad.sub.90 =hie-cdet

if cdet-low.sub.90 >hi.sub.90 -cdet then max.sub.13 rad.sub.90 =cdet-
low.sub.90
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else max.sub.13 rad.sub.90 =hi.sub.90 -cdet
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As indicated by process block 117 and illustrated in FIG. 5 the next step is to determine the distance "adj" between the patient center cent.sub.0 or cent.sub.90 and the isocenter, cdet, as measured in the narrower of the two orthogonal projections.

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sep.sub.0 =hi.sub.0 -low.sub.0
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sep.sub.90 =hi.sub.90 -low.sub.90
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if sep.sub.0 >sep.sub.90 then .phi.=0 and
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.theta.=90 else .phi.=90 and .theta.=0.
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adj=(sgn.sub..theta.)(src)(tan(cent.theta.-cdet)(pitch))
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where src=distance in cm from x-ray source 13 to isocenter 19;

pitch=angle between detector elements 18 in degrees;

sgn.sub.0 =-1 or sgn.sub.90 =1.

Referring still to FIGS. 3 and 5, the radius of the display field of view DFOV can now be calculated as indicated at process block 119. This is the distance between the patient center cent.sub.0 or cent.sub.90 and the most remote edge of the patient and is calculated as follows:

$$\text{DFOV}=(\text{src}+\text{adj})(\tan((\text{sep.sub.100}/2)(\text{pitch}))).$$

As indicated at process block 120, the radius of the scan field of view SFOV is then calculated. This is the distance between the system isocenter 19 and the most remote edge of the two orthogonal projections:

$$\text{SFOV}=(\text{src}+\text{adj})(\tan((\text{max.sub.-- rad.phi.})(\text{pitch}))).$$

As indicated at process block 121 the x and y offsets X.sub.OFF and Y.sub.OFF are then calculated. These are the distances between the system isocenter 19 and the center of the patient along the respective horizontal and vertical axes:

$$\text{Y.sub.OFF}=(\text{sgn.sub.90})(\text{src})(\tan((\text{cent.sub.90}-\text{cdet})(\text{pitch})))$$

$$\text{X.sub.OFF}=(\text{sgn.sub.0})(\text{src})(\tan((\text{cent.sub.0}-\text{cdet})(\text{pitch})))$$

In a typical scout scan the two orthogonal scout projections are acquired at a succession of slice locations along the z axis over the entire anatomy to be imaged. These samples may be spaced apart 1 mm and as many as 250 separate values for DFOV, SFOV, X.sub.OFF and Y.sub.OFF are produced by the above

process. While these geometric scan parameters could be used directly to change the set-up for each separate slice designated by the operator, in the preferred embodiment a single value for each parameter is output to the operator for use over the entire range of selected slices.

Referring again to FIG. 4, the geometric scan parameters over the selected range of slices to be imaged are first filtered as indicated by process block 123. A low pass filter such as a 5 point box car filter is used to remove high frequency variations in the value of each parameter over the selected z axis range. As indicated at process block 125 the mean value of each set of filtered parameters SFOV, DFOV, X.sub.OFF and Y.sub.OFF are then output to the operator and become the default set-up for the scan which is subsequently performed at 127. Since centering of the patient about the system isocenter 19 is an important factor in image quality, it is contemplated that the operator may choose to change the table height before conducting the scan if the vertical offset Y.sub.OFF is excessive. In the past centering along the horizontal axis has not been a problem for operators and X.sub.OFF will usually be minimal and not require repositioning of the patient.

The edges of the patient are located in each scout projection and the center 115 of the patient 15 is then located in each projection, with the same edges used to determine the edge which is furthest from the isocenter 19 in each projection. Simply missing from the Office Action's citation to Toth '724 is any mention of the at least one processor that is caused to determine the centroid of the subject from the at least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15. This point is even conceded by the Office Action (enumerated paragraph 6, page 4): "Toth fails to disclose scanning for determining a center of mass."

So, the Office Action's citation to Toth '724 fails to satisfy at least one of the limitations recited in Applicants' independent claim 15.

The shortcomings of the Office Action's citation to Toth '724 relative to certain elements of the claimed invention have been discussed above. The Office Action proposes a combination of the citation to Toth '724 with a citation to Zhou. However, the Office Action's citation to Zhou does not overcome the deficiency of the Office Action's citation to Toth '724. Applicants respectfully submit that the proposed combination of the Office Action's citation to Toth '724 with the Office Action's citation to Zhou fails to provide the required configuration, assuming, *arguendo*, that the combination of the Office Action's citation to Toth '724 with the Office Action's citation to Zhou is proper.

Zhou discloses (paragraph 68) the object positioner:

The object positioner adjusts the position of an object to be imaged within the imaging zone. For example, the object positioner can place an object

between the x-ray source and the array or matrix of the detector. In one example, the object to be imaged is stationarily mounted onto the object positioner such that a centroid of the object to be imaged is positioned centrally within the imaging zone. In a CT application, the object can be a patient suitably oriented within the imaging zone. Further, the centroid can correspond to the physiological function to be monitored, such as the heart.

The object to be imaged is stationarily mounted onto the object positioner such that a centroid of the object to be imaged is positioned centrally within the imaging zone. Simply missing from the Office Action's citation to Zhou is any mention of the at least one processor that is caused to determine the centroid of the subject from the at least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15.

So, the Office Action's citation to Zhou fails to satisfy at least one of the limitations recited in Applicants' independent claim 15.

The shortcomings of the Office Action's citations to Toth '724 and Zhou relative to certain elements of the claimed invention have been discussed above. The Office Action proposes a combination of the citations to Toth '724 and Zhou with a citation to Li. However, the Office Action's citation to Li does not overcome the deficiency of the Office Action's citations to Toth '724 and Zhou. Applicants respectfully submit that the proposed combination of the Office Action's citations to Toth '724 and Zhou with the Office Action's citation to Li fails to provide the required configuration, assuming, *arguendo*, that the combination of the Office Action's citations to Toth '724 and Zhou with the Office Action's citation to Li is proper.

The Office Action's provides the following citation to Li:

Li teaches a computer readable storage medium having stored thereon a computer program representing a set of instructions, which when executed by at least one processor or computer, causes the processor or computer to perform steps (claim 9).

The Office Action's citation to Li, assuming, *arguendo*, it is correct, on its face fails to disclose, *inter alia*, the at least one processor that is caused to determine the centroid of the subject from the at least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15.

So, the Office Action's citation to Li fails to satisfy at least one of the limitations recited in Applicants' independent claim 15.

The shortcomings of the Office Action's citations to Toth '724, Zhou, and Li relative to certain elements of the claimed invention have been discussed above. The Office Action

proposes a combination of the citations to Toth '724, Zhou, and Li with a citation to Lienard. However, the Office Action's citation to Lienard does not overcome the deficiency of the Office Action's citations to Toth '724, Zhou, and Li. Applicants respectfully submit that the proposed combination of the Office Action's citations to Toth '724, Zhou, and Li with the Office Action's citation to Lienard fails to provide the required configuration, assuming, *arguendo*, that the combination of the Office Action's citations to Toth '724, Zhou, and Li with the Office Action's citation to Lienard is proper.

Lienard discloses (paragraph 17) the means for processing 100:

FIGS. 2 and 3 shows an embodiment of the invention. On acquiring an X-ray image 21, the device, because of its construction, the relative positions of the source S, of the means 20 for acquiring an image and of the support 30 are known. The operator defines, on the image 21 which is presented on the screen of the means 101 for interface, a region or area 22 in which the projection of the object 45 is found. Once this region 22 is defined, the means for processing 100 converts this region 22 into a volume 15, 16, for which it determines the position of the center of gravity. The position of this center of gravity gives an estimate of the distance z between the source S and the object 45 which is to be X-rayed. This estimate is used by the means for processing 100 in order to calibrate the images which will be made of the object 45 and particularly to calculate the magnification factor f between the object 45 and the images. The magnification is factor f equal to the ratio Z/z, where Z is the distance between the source S and the means for acquiring an image 20.

The means for processing 100 converts the region 22 into the volume 15, 16, for which it determines the position of the center of gravity that gives the estimate of the distance z between the source S and the object 45 which is to be X-rayed, with the estimate used by the means for processing 100 in order to calibrate the images which will be made of the object 45 and particularly to calculate the magnification factor f between the object 45 and the images. Simply missing from the Office Action's citation to Lienard is any mention of the at least one processor that is caused to determine the centroid of the subject from the at least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15.

So, the Office Action's citation to Lienard fails to satisfy at least one of the limitations recited in Applicants' independent claim 15.

In connection with a number of Applicants' other claims, the Office Action's citations to Kendrick and Kobayahi, assuming, *arguendo*, they are correct, on their face fail to disclose, *inter alia*, the at least one processor that is caused to determine the centroid of the subject from the at

least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15.

The Office Action's citations to Toth '724, Zhou, Li, Lienard, Kendrick and Kobayahi all fail to meet at least one of Applicants' claimed features. For example, there is no teaching or suggestion in the Office Action's citations to Toth '724, Zhou, Li, Lienard, Kendrick and Kobayahi of the at least one processor that is caused to determine the centroid of the subject from the at least one of: the at least two scout scans; and the at least one scout scan and the elevational profile of the subject, as recited in Applicants' independent claim 15.

Furthermore, the Office Action does not allege that the art of record provides any teaching, suggestion, or incentive for modifying the citations to Toth '724, Zhou, Li, Lienard, Kendrick and/or Kobayahi to provide the claimed configuration.

For all the reasons presented above with reference to claim 15, claims 15, 22, and 27 are believed neither anticipated nor obvious over the art of record. The corresponding dependent claims are believed allowable for the same reasons as independent claims 15, 22, and 27, as well as for their own additional characterizations.

Withdrawal of the § 103 rejections is therefore respectfully requested.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-12 and 14-29.

Applicant hereby authorizes charging of deposit account no. 07-0845 for any additional fees associated with entering the aforementioned claims.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,

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